

REMARKS / ARGUMENTS

This application is believed to be in condition for allowance because the claims, as amended, are believed to be non-obvious and patentable over the cited references. The following paragraphs provide the justification for this belief. In view of the following reasoning for allowance, the Applicant hereby respectfully requests further examination and reconsideration of the subject patent application.

1.0 Analysis Section of the Decision on Appeal:

In the decision on Appeal dated August 28, 2009, the Board explained the following with respect to Applicants claims:

“At the outset, we note that Appellant's assertion (App. Br. 10) that the claims require “**a direct function of the fractional pixel offset positions**,” is misplaced as the claim language only requires “a function of the fractional pixel offset positions” and the claim language is silent as to whether this is a *direct* or *indirect* function (FF 1). Thus, the claim language does not preclude an indirect function for determining the fractional pixel positions. Furthermore, the additional features of computing global motion models and deriving motion vectors from the motion model for relating a reference image to every other image as taught by Crinon (FF 2) are not precluded because the transitional term “comprising” is inclusive or open-ended and does not exclude additional, unrecited elements (FF 1). See *Genentech*, 112 F.3d at 501.” (emphasis added)

In response, Applicants have amended each of the independent claims (i.e., claims 1, 13, 25, and 33), to address the issues raised by the Decision on Appeal.

In particular, each of the independent claims have been amended to recite the term “**direct function**” in place of the term “function”. Further, each of the independent claims has also been amended such that the preamble of these claims uses the transitional

phrase "**consisting of...**" in place of the transitional phrase "comprising". As explained by MPEP §2111.03, the transitional phrase "consisting of..." excludes any element, step, or ingredient not specified in the claim.

Finally, as discussed in further detail below, the claimed "direct function" in each of the independent claims has been further defined by the inclusion of additional limitations to each independent claim to recite novel limitations not disclosed by the cited references.

2.0 Rejections under 35 U.S.C. §103:

The final Office Action of rejected claims 1-4, 6-8, 11-13, 16-20, and 22-33 under 35 U.S.C. §103(a) as being unpatentable over Crinon, et al. ("**Crinon**," U.S. Patent 6,285,804), in view of Steinkirchner ("**Steinkirchner**," U.S. Patent 5,392,365)

In order to deem the Applicant's claimed invention unpatentable under 35 U.S.C. §103(a), a prima facie showing of obviousness must be made. However, as fully explained by the M.P.E.P. Section 706.02(j), to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, ***the prior art reference (or references when combined) must teach or suggest all the claim limitations.***

Further, in order to make a prima facie showing of obviousness under 35 U.S.C. 103(a), all of the claimed elements of an Applicant's invention must be considered, especially when they are missing from the prior art. If a claimed element is not taught in the prior art and has advantages not appreciated by the prior art, then no prima facie case of obviousness exists. The Federal Circuit court has stated that it was error not to distinguish claims over a combination of prior art references where a material limitation in

the claimed system and its purpose was not taught therein (*In Re Fine*, 837 F.2d 107, 5 USPQ2d 1596 (Fed. Cir. 1988)).

2.1 Rejection of Claims 1-4, 6-8, and 11-12 under 35 U.S.C. §103(a):

The Final Office Action dated June 7, 2005 rejected independent claim 1 under 35 U.S.C. §103(a) based on the rationale that the proposed ***Crinon – Steinkirchner*** combination reference discloses the elements of the Appellant's claimed "text document capture method..." This rejection was upheld in the Decision on Appeal dated August 28, 2009.

In response, Applicants have amended independent claim 1 to include limitations not disclosed by the proposed ***Crinon – Steinkirchner*** combination reference. Specifically, as noted above, independent claim 1 now recites the transitional phrase "***consisting of...***" in place of the transitional phrase "comprising", thereby excluding any element, step, or ingredient not specified in the claim. As such, the interpretation of the ***Crinon*** reference must be construed with respect to exact limitations of independent claim 1.

With respect to the claim limitations, it is important to note that the Decision on Appeal specifically explained the following with respect to the claimed fractional pixel offsets:

"...Crinon further teaches that the ***motion vector*** 22(2) mapped to the image 16B at time $t=t_0+2$ has an inter-pixel position 24B closest to the existing pixel position 26B (FF 6). ***Crinon teaches that the distance d_i between position 24B and 26B is the smallest distance for any one of the motion vectors*** 22 (i.e., 4 motion vectors shown in Fig. 5) at high resolution point 20A (FF 7). Crinon teaches that the pixel intensity value for grid location 20A is derived using spatial interpolation (FF 7)..." (emphasis added)

In other words, **Crinon** determines pixel offset distances based on computed motion vectors. However, in stark contrast to the ***motion-vector-based distances*** admittedly disclosed by the **Crinon** reference, claim 1, as amended now recites limitations that specifically indicate that the claimed fractional pixel offsets are determined “...***directly from the lateral displacement of each digital image...***” As such, it should be clear that, since the claimed fractional pixel offsets are computed in a manner entirely different from that disclosed by the **Crinon** reference, the **Crinon** reference fails to disclose the claimed fractional pixel offsets.

Further, the “direct function” using the claimed fractional pixel offsets now recited in claim 1 is specifically defined using the following novel language:

“...said direct function providing a **weighted combination of the image values** of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, ***which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offset positions...***”

Applicants respectfully suggest that no such feature is disclosed by the **Crinon** reference since the **Crinon** reference instead computes ***global motion models*** from which ***motion vectors*** are derived for relating a reference image to every other image, with those motion vectors being used for mapping image pixels to “inter-pixel positions” which are in turn used to map pixel intensities to “high-resolution grid points...” Again, the Appellant simply computes enhanced resolution images as ***a direct function of the fractional pixel offset positions*** determined ***directly from the lateral displacement of each digital image***, as described above and as now specifically claimed.

Thus, it is clear that the present invention, as claimed by independent claim 1, includes elements not taught in the proposed **Crinon - Steinkirchner** combination reference. Consequently, the rejection of independent claim 1, and thus of dependent claims 2-8 and 11-12, under 35 U.S.C. §103(a) is not proper. Therefore, the Appellant respectfully requests reconsideration of the rejection of claims 1-8 and 11-12 under 35

U.S.C. §103(a) in view of the novel language of claim 1, as amended. In particular, claim 1 recites the following novel language:

“A text document capture method for digitizing a text document segment in printed form, **consisting of:**

imparting a continuous lateral jittering between a digital imaging device and the text document;

obtaining multiple laterally-displaced digital images of all of the text document segment during the continuous lateral jittering and determining fractional pixel offset positions at which each image was obtained;

forming from the multiple laterally displaced images enhanced resolution image pixels of an enhanced resolution representation of the text document as a **direct function** of the fractional pixel offset positions;

said direct function providing a weighted combination of the image values of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, that are determined to be nearest each enhanced resolution image pixel using the fractional pixel offset positions;
and

de-blurring the enhanced resolution representation of the text document by thresholding the enhanced resolution representation into either one of two pixel luminance levels, representing foreground and background pixels, with the foreground pixels corresponding to text in the text document.” (emphasis added)

2.2 Rejection of Claims 13-20, 22, and 23:

In general, the Office Action rejected independent claim 13 under 35 U.S.C. §103(a) over the proposed **Crinon - Steinkirchner** combination reference using virtually the same rationale as discussed with respect to the rejection of claim 1. Again, this rejection was upheld by the Decision on Appeal.

In response, Applicants have amended independent claim 13 to include limitations not disclosed by the proposed **Crinon – Steinkirchner** combination reference. Specifically, as noted above, independent claim 13 now recites the transitional phrase “**consisting of...**” in place of the transitional phrase “comprising”, thereby excluding any element, step, or ingredient not specified in the claim. As such, the interpretation of the **Crinon** reference must be construed with respect to exact limitations of independent claim 13.

With respect to the claim limitations, it is important to note that the Decision on Appeal specifically explained the following with respect to the claimed fractional pixel offsets:

“...Crinon further teaches that the **motion vector** 22(2) mapped to the image 16B at time $t=t_0+2$ has an inter-pixel position 24B closest to the existing pixel position 26B (FF 6). **Crinon teaches that the distance d_i between position 24B and 26B is the smallest distance for any one of the motion vectors** 22 (i.e., 4 motion vectors shown in Fig. 5) at high resolution point 20A (FF 7). Crinon teaches that the pixel intensity value for grid location 20A is derived using spatial interpolation (FF 7)...” (emphasis added)

In other words, **Crinon** determines pixel offset distances based on computed motion vectors. However, in stark contrast to the **motion-vector-based distances** admittedly disclosed by the **Crinon** reference, claim 13, as amended now recites limitations that specifically indicate that the claimed fractional pixel offsets are determined “...**directly from the lateral displacement of each digital image...**” As such, it should be clear that, since the claimed fractional pixel offsets are computed in a manner entirely different from that disclosed by the **Crinon** reference, the **Crinon** reference fails to disclose the claimed fractional pixel offsets.

Further, the “direct function” using the claimed fractional pixel offsets now recited in claim 13 is specifically defined using the following novel language:

“...wherein the enhanced resolution image pixels are computed ***from a weighted combination of the image values*** of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, ***which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offset positions...***”

Applicants respectfully suggest that no such feature is disclosed by the ***Crinon*** reference since the ***Crinon*** reference instead computes ***global motion models*** from which ***motion vectors*** are derived for relating a reference image to every other image, with those motion vectors being used for mapping image pixels to “inter-pixel positions” which are in turn used to map pixel intensities to “high-resolution grid points...” Again, the Appellant simply computes enhanced resolution images as ***a direct function of the fractional pixel offset positions*** determined ***directly from the lateral displacement of each digital image***, as described above and as now specifically claimed.

Thus, it is clear that the present invention, as claimed by independent claim 13, includes elements not taught in the proposed ***Crinon - Steinkirchner*** combination reference. Therefore, because the present invention, as claimed by independent claim 13 includes elements not taught in the proposed ***Crinon - Steinkirchner*** combination reference, the rejection of independent claim 13, and of dependent claims 14-20, 22, and 23, under 35 U.S.C. §103(a) is not proper. Therefore, the Applicant respectfully requests reconsideration of the rejection of claims 13-20, 22, and 23 under 35 U.S.C. §103(a) in view of the novel language of claim 13, as amended. In particular, independent claim 13 recites the following novel language:

“A text document capture system for digitizing with a digital imaging device a segment of a text document in printed form, ***consisting of:***

a jittering mechanism for imparting a continuous lateral jittering between the text document and the digital imaging device while it obtains multiple laterally-displaced digital images of all of the text document segment, said lateral jittering moving through a distance being on the order of around one pixel;

a pixel offset determination system for determining ***fractional pixel offset positions*** at which each digital image was ***obtained directly from the lateral displacement of each digital image***;

a processing system for forming enhanced resolution image pixels of an enhanced resolution representation of the text document segment from the multiple laterally displaced images as a ***direct function*** of the pixel offset positions corresponding to each digital image, and for de-blurring the enhanced resolution representation; and

wherein the enhanced resolution image pixels are computed from a weighted combination of the image values of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offset positions." (emphasis added)

2.3 Rejection of Claims 25-29 and 31-32:

In general, the Office Action rejected independent claim 25 under 35 U.S.C. §103(a) over the proposed ***Crinon - Steinkirchner*** combination reference using virtually the same rationale as discussed with respect to the rejection of claim 1. Again, this rejection was upheld by the Decision on Appeal.

In response, Applicants have amended independent claim 25 to include limitations not disclosed by the proposed ***Crinon – Steinkirchner*** combination reference. Specifically, as noted above, independent claim 25 now recites the transitional phrase "***consisting of...***" in place of the transitional phrase "comprising", thereby excluding any element, step, or ingredient not specified in the claim. As such, the interpretation of the ***Crinon*** reference must be construed with respect to exact limitations of independent claim 25.

With respect to the claim limitations, it is important to note that the Decision on Appeal specifically explained the following with respect to the claimed fractional pixel offsets:

“...Crinon further teaches that the ***motion vector*** 22(2) mapped to the image 16B at time $t=t_0+2$ has an inter-pixel position 24B closest to the existing pixel position 26B (FF 6). ***Crinon teaches that the distance d_i between position 24B and 26B is the smallest distance for any one of the motion vectors*** 22 (i.e., 4 motion vectors shown in Fig. 5) at high resolution point 20A (FF 7). Crinon teaches that the pixel intensity value for grid location 20A is derived using spatial interpolation (FF 7)...” (emphasis added)

In other words, ***Crinon*** determines pixel offset distances based on computed motion vectors. However, in stark contrast to the ***motion-vector-based distances*** admittedly disclosed by the ***Crinon*** reference, claim 25, as amended recites limitations that specifically indicate that the claimed fractional pixel offsets are “...***relative to an original position of the text document relative to the digital imaging device...***” As such, it should be clear that, since the claimed fractional pixel offsets are determined in a manner entirely different from that disclosed by the ***Crinon*** reference, the ***Crinon*** reference fails to disclose the claimed fractional pixel offsets.

Further, the “direct function” using the claimed fractional pixel offsets now recited in claim 25 is specifically defined using the following novel language:

“...said direct function providing a weighted combination ***of a plurality of multiple image pixel samples***, derived from the multiple laterally-displaced digital images, which are ***determined to be nearest each enhanced resolution image pixel using the fractional pixel offsets...***”

Applicants respectfully suggest that no such feature is disclosed by the ***Crinon*** reference since the ***Crinon*** reference instead computes ***global motion models*** from

which ***motion vectors*** are derived for relating a reference image to every other image, with those motion vectors being used for mapping image pixels to “inter-pixel positions” which are in turn used to map pixel intensities to “high-resolution grid points...” Again, the Appellant simply computes enhanced resolution images as ***a direct function of the fractional pixel offset positions determined directly from the lateral displacement of each digital image***, as described above and as now specifically claimed.

Thus, it is clear that the present invention, as claimed by independent claim 25, includes elements not taught in the proposed ***Crinon - Steinkirchner*** combination reference. Therefore, because the present invention, as claimed by independent claim 25 includes elements not taught in the proposed ***Crinon - Steinkirchner*** combination reference, the rejection of independent claim 25, and of dependent claims 26-29 and 31-32, under 35 U.S.C. §103(a) is not proper. Therefore, the Applicant respectfully requests reconsideration of the rejection of claims 25-29 and 31-32 under 35 U.S.C. §103(a) in view of the novel language of claim 25, as amended. In particular, independent claim 25 recites the following novel language:

“In a computer-readable medium, text document capture software for digitizing with a digital imaging device a text document segment in printed form, ***consisting of:***

software for imparting controlled continuous lateral jittering between the text document and the digital imaging device;

software for obtaining multiple laterally-displaced digital images of all of the text document segment at a plurality of non-predetermined ***fractional pixel offsets relative to an original position of the text document relative to the digital imaging device;***

software for determining the fractional pixel offsets of each digital image;

software for forming enhanced resolution image pixels of an enhanced resolution representation of the text document segment from the multiple laterally displaced images as a ***direct function*** of the fractional pixel offsets;

said direct function providing a weighted combination of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offsets; and

software for de-blurring the enhanced resolution representation.” (emphasis added)

2.4 Rejection of Claim 33:

In general, the Office Action rejected independent claim 33 under 35 U.S.C. §103(a) over the proposed ***Crinon - Steinkirchner*** combination reference using virtually the same rationale as discussed with respect to the rejection of claim 1. Again, this rejection was upheld by the Decision on Appeal.

In response, Applicants have amended independent claim 33 to include limitations not disclosed by the proposed ***Crinon – Steinkirchner*** combination reference. Specifically, as noted above, independent claim 33 now recites the transitional phrase “***consisting of...***” in place of the transitional phrase “comprising”, thereby excluding any element, step, or ingredient not specified in the claim. As such, the interpretation of the ***Crinon*** reference must be construed with respect to exact limitations of independent claim 33.

With respect to the claim limitations, it is important to note that the Decision on Appeal specifically explained the following with respect to the claimed fractional pixel offsets:

“...Crinon further teaches that the ***motion vector*** 22(2) mapped to the image 16B at time $t=t_0+2$ has an inter-pixel position 24B closest to the existing pixel position 26B (FF 6). ***Crinon teaches that the distance d_i between position 24B and 26B is the smallest distance for any one of the motion vectors*** 22 (i.e., 4 motion vectors shown in Fig. 5) at high resolution point 20A (FF 7). Crinon teaches that the

pixel intensity value for grid location 20A is derived using spatial interpolation (FF 7)...” (emphasis added)

In other words, **Crinon** determines pixel offset distances based on computed motion vectors. However, in stark contrast to the ***motion-vector-based distances*** admittedly disclosed by the **Crinon** reference, claim 33, as amended now recites limitations that specifically indicate that the claimed fractional pixel offsets are determined ***“...directly from the lateral displacement of each digital image...”*** As such, it should be clear that since the claimed fractional pixel offsets are computed in a manner entirely different from that disclosed by the **Crinon** reference, the **Crinon** reference fails to disclose the claimed fractional pixel offsets.

Further, the “direct function” using the claimed fractional pixel offsets now recited in claim 13 is specifically defined using the following novel language:

“...said direct function providing a **weighted combination of a plurality of multiple image pixel samples**, derived from the multiple laterally-displaced digital images, which are ***determined to be nearest each enhanced resolution image pixel using the fractional pixel offset distances...***”

Applicants respectfully suggest that no such feature is disclosed by the **Crinon** reference since the **Crinon** reference instead computes ***global motion models*** from which ***motion vectors*** are derived for relating a reference image to every other image, with those motion vectors being used for mapping image pixels to “inter-pixel positions” which are in turn used to map pixel intensities to “high-resolution grid points...” Again, the Appellant simply computes enhanced resolution images as ***a direct function of the fractional pixel offset positions*** determined ***directly from the lateral displacement of each digital image***, as described above and as now specifically claimed.

Thus, it is clear that the present invention, as claimed by independent claim 33, includes elements not taught in the proposed **Crinon - Steinkirchner** combination

reference. Therefore, because the present invention, as claimed by independent claim 33 includes elements not taught in the proposed **Crinon - Steinkirchner** combination reference, the rejection of independent claim 33 under 35 U.S.C. §103(a) is not proper. Therefore, the Applicant respectfully requests reconsideration of the rejection of claim under 35 U.S.C. §103(a) in view of the novel language of claim 33, as amended. In particular, independent claim 33 recites the following novel language:

“An image capture method for digitizing a spatially piecewise constant image,
consisting of:

imparting a continuous lateral jittering between a digital imaging device and the spatially piecewise constant image;

obtaining multiple laterally-displaced digital images of all of the spatially piecewise constant image during the continuous later jittering;

computing a **fractional pixel offset distance** representing a pixel capture position for each digital image **directly from the lateral displacement of each digital image;**

forming from the multiple laterally displaced images enhanced resolution image pixels of an enhanced resolution representation of the spatially piecewise constant image as a **direct** function of the computed fractional pixel offset distances;

said direct function providing a weighted combination of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offset distances; and

de-blurring the enhanced resolution representation of the spatially piecewise constant image.” (emphasis added)

3.0 Rejection of Claims 5, 14, and 15:

The Office Action rejected dependent claims 5, 14, and 15 under 35 U.S.C. §103(a) as being unpatentable over **Crinon** in view of **Steinkirchner**, and in further view of

Matsumoto, ("**Matsumoto**" U.S. Patent 5,801,814). However, it should be noted that claim 5 is dependent from dependent claim 1, while claims 14 and 15 are dependent from independent claim 13, which, as discussed above, is patentable under 35 U.S.C. §103(a). Consequently, because there is no valid rejection of the parents claim (claims 1 and 13, respectively), the use of an additional reference to address a particular feature of a dependent claim is insufficient to provide valid grounds for rejection of the dependent claim (claims 5, 14, and 15). Consequently, as there is no valid rejection of claims 1 and 13, the Applicants respectfully request reconsideration of the rejection of claims 5, 14, and 15, under 35 U.S.C. §103(a) based on the novel language of independent claims 1 and 13.

4.0 Rejection of Claim 24:

The Office Action rejected dependent claim 24 under 35 U.S.C. §103(a) as being unpatentable over **Crinon** in view of **Steinkirchner**, and in further view of Reinsh, ("**Reinsh**" U.S. Patent 5,083,313). However, it should be noted that claim 24 is dependent from independent claim 13, which, as discussed above, is patentable under 35 U.S.C. §103(a). Consequently, because there is no valid rejection of the parent claim (claim 13), the use of an additional reference to address a particular feature of a dependent claim is insufficient to provide valid grounds for rejection of the dependent claim (claim 24). Consequently, as there is no valid rejection of claim 13, Applicants respectfully request reconsideration of the rejection of claim 24 under 35 U.S.C. §103(a) based on the novel language of independent claim 13.

CONCLUSION

In view of the above discussion, it is respectfully submitted that claims 1-8, 11-20, 22-29 and 21-33 are in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of claims 1-8, 11-20, 22-29 and 21-33, and the objection to claim 20, and to pass this application to issue at the earliest opportunity. Additionally, in an effort to further the prosecution of the subject application, the Applicant kindly invites the Examiner to telephone the Applicant's attorney at (805) 278-8855 if the Examiner has any additional questions or concerns.

Respectfully submitted,



Lyon & Harr
300 Esplanade Drive, Suite 800
Oxnard, California 93036
(805) 278-8855

Mark A. Watson
Registration No. 41,370
Attorney for Applicant